Amendments to the Drawings:

The attached replacement drawing sheet makes changes to Fig. 14 and replaces the original sheet with Fig. 14.

Attachment: Replacement Sheet

REMARKS

Claims 1-22 are pending in this application. By this Amendment, claims 1, 20 and 22 are amended. The title and the drawings are amended, as the Examiner requested. The amendments introduce no new matter. Claim 23 is canceled without prejudice or disclaimer of the subject matter.

Applicants gratefully acknowledge the courtesies extended to Applicants' representatives by Examiner Repko in the June 13, 2006 personal interview. The substance of the interview is incorporated into the following remarks.

I. Informalities

The Office Action objected to the drawings, asserting that they included reference characters not mentioned in the description: 734-1, 734-2, and 734-3 in Fig. 14. A replacement drawing sheet has been submitted correcting this error. Withdrawal of this objection is respectfully requested.

The title of the invention was objected to as being not descriptive. By this amendment, the specification has been amended with a new title that is clearly indicative of the invention to which the claims are directed. Withdrawal of this objection is respectfully requested.

II. Non-Statutory Subject Matter

The Office Action rejected claims 20, 22 and 23 under 35 U.S.C. §101 as being directed to non-statutory subject matter. Claims 20 and 22 have been amended to obviate this rejection. Withdrawal of the non-statutory subject matter rejection of claims 20 and 22 is respectfully requested.

Claim 23 has been cancelled in this Amendment, rendering the rejection of claim 23 moot.

III. Claim Rejections Under 35 U.S.C. §103

The Office Action rejects claims 1-4 and 7-23 under 35 U.S.C. §103(a) as being unpatentable over Arias (U.S. Patent No. 5,966,134) in view of Meier ("Painterly Rendering for Animation," Aug. 4, 1996, SIGGRAPH '96 Conference Proceedings, p. 477-484); and rejects claims 5 and 6 under 35 U.S.C. §103(a) over Arias and Meier in view of Shapiro. These rejections are respectfully traversed.

III.a. One of Ordinary Skill would not Have Been Motivated to Combine Arias and Meier

The Office Action asserts that the subject matter recited in the claims is obvious under 35 U.S.C. §103(a) over Arias in view of Meier. This assertion is respectfully traversed, because one of ordinary skill would not have been motivated to combine Meier with Arias.

Applicants respectfully assert that the brush images of Meier cannot be combined with the method disclosed in Arias because the brush images of Meier defeat the purpose of the method disclosed in Arias. The purpose of Arias is to transform a computer rendered image into a traditional animated cell or "toon" look. Arias, col. 1, lines 41-45; col. 2, lines 10-18. Arias describes in detail the traditional "toon" look which his method is directed to achieving.

> Those artisans of the cell animation process will appreciate that there is a considerable difference in appearance between a typical computer image rendered with smoothly varying colors and a hand-drawn cell of the traditional type used in high quality cell animations. While many subjective characteristics may be ascribed to the traditional animated cell, there are at least two distinctive features that are signature characteristics. Specifically, a traditional cell begins with a line drawing, i.e., the ink of the ink and paint, which is commonly referred to as "outlining." Secondly, a traditional cell is then painted with various solid colors, corresponding to the paint of the traditional ink and paint technique. In contrast, a normal computer rendered image does not include outlining, and the colors used in the rendering are typically smoothly blended between the shadow areas and the highlight areas to achieve a more natural 3-D look, e.g., using techniques such as goraud or phong shading. Animations made with rendered images thus

> do not appear like traditional cell animations or "tunes." Arias, col. 1, lines 46-64.

The method of Arias specifically removes elements of gradation, shading, and realism. "A conventional rendering produces an image in which there is typically a smooth color transition in the shading applied to the surface of objects, thereby producing a scene in which objects appear naturally illuminated and as life-like as possible. In contrast, the present invention can be thought of as applying overlapping opaque layers of solid colors to illustrate an object in a scene." Arias, col. 7, lines 40-46.

The use of brush strokes, as taught by Meier, adds variation to the look of the rendered image. The method of Arias is designed to reduce or remove variation from the rendered image. Further, the use of brush strokes as taught by Meier destroys the solid colors required to achieve the "toon" look of Arias.

Thus, because brush strokes as taught by Meier cannot be combined with the method of Arias without defeating the purpose of Arias, one of ordinary skill in the art would not have been motivated to combine Meier with Arias in this manner. Withdrawal of all claims rejected under 35 U.S.C. §103(a) as being unpatentable over Arias in view of Meier is respectfully requested.

III.b. Arias Does Not Disclose Features Recited in the Claims

The Office Action asserts that Arias discloses all features recited in the claims, except for the brush strokes as taught by Meier. Applicants respectfully traverse this assertion.

Applicants submit that Arias does not disclose at least rendering in real-time a three-dimensional object viewed from a predetermined view point by generating an image of the three-dimensional object and writing color information on the image generated in a rendering buffer, as recited in amended claim 1, and similarly recited in claim 21.

First, Arias does not disclose generating images in real time. Instead, Arias discloses only that the use of separate RGB values for each pixel in the edge detection kernel results in the method having unacceptably long calculation times. Arias, col. 10, lines 56-67. Arias is silent on the actual time consumed to generate each image.

Second, Arias does not disclose generating an image of a three-dimensional object. Instead, Arias discloses starting with the normal rendered frame produced by the computer 3-D rendering of an image (Arias, col. 2, lines 14-17) and then generating an image with a 2-D "toon" look (Arias, col. 1, lines 41-64).

Furthermore, Arias does not disclose at least rendering the image of the three-dimensional object so as to reflect color information of the projection image at a part at which a retouched image is transparent by synthesizing the retouched image with the projection image, as recited in amended claim 1, and similarly recited in claim 21. Instead, Arias discloses applying overlapping opaque layers of solid colors to illustrate an object. Arias, col. 7, lines 44-46 and col. 15, lines 29-36 (claim 1).

Thus, according to claims 1 and 21, and as supported in the specification at least at page 5, line 26 - page 6, line 20, the following effects can be obtained. Color information is not reflected at a part where the brush images are not arranged or the number of superposed brush images is small, and the part becomes a transparent part. However, by synthesizing the projection image with the retouched image, color information of a surface of the three-dimensional object is reflected at the transparent part. Consequently, it is not necessary for generating the retouched image to spread the brush images all over the surface. For example, by generating the retouched image in which the brush images are arranged at a part of the surface of the three-dimensional object, the costs (e.g., processing time) for generating the retouched image are decreased, and further, the image of the whole three-dimensional object can have a pictorial tone.

Applicants respectfully submit that because Arias does not disclose rendering images in real time, generating an image of a three-dimensional object, or rendering the image of the three-dimensional object so as to reflect color information of the projection image at a part at which the retouched image is transparent, Arias fails to disclose the subject matter of claims 1 and 21. Also, Meier and Shapiro do not supply the subject matter lacking in Arias. Thus, even if Meier and/or Shapiro could be combined with Arias without defeating the purpose of Arias, such a combination does not disclose the subject matter of claims 1 and 21 and claims 2-20 and 22 depending therefrom.

III.c. Arias Teaches Away from the Subject Matter Recited in the Claims

Applicants submit that Arias teaches away from the generation of three-dimensional images with realistic detail, gradation, and shading.

Arias is in the field of creating cel images for use in animation, and is specifically concerned with the problem of generating images with the hand-drawn appearance of a traditional two-dimensional cartoon. The method of Arias selects from a plurality of predefined colors. Arias col. 2, lines 26-30. "Secondly, a traditional cel is then painted with various solid colors, corresponding to the paint of the traditional ink-and-paint technique." Arias col. 1, lines 55-57. "Animations made with rendered images thus do not appear like traditional cel animations or 'toons'." Arias col. 1, lines 62-64.

The claims, however, are directed to generating pictorial images of three-dimensional objects, and are concerned with generating such three-dimensional images with a hand-drawn appearance at higher speed.

Further, Arias teaches away from the generation of three-dimensional images by the use of gradation and shading.

> "A conventional rendering produces an image in which there is typically a smooth color transition in the shading applied to the surface of objects, thereby producing a scene in which objects

> appear naturally illuminated and as lifelike as possible. In contrast, the present invention can be thought of as applying overlying opaque layers of solid colors to illustrate an object in a scene. The color of a surface produced by the present invention depends upon the angle of the surface and the light striking it. Thus, a point on the surface of an object is by default painted a basic fill color, receiving a highlight color only if it faces a light source. Areas of the scene which are in shadow because light from the source is precluded from illuminating the surface, for example, due to occlusion by another surface, are painted a shadow color. The fill, shadow, and highlight colors that are employed in the present invention can be considered analogous to the ambient, diffuse, and specular colors typically specified for a conventional material shader used to render a scene, but the result of rendering a scene using a conventional material shader is very different from that obtained by the rendering using the Toon Paint material shader." Arias, col. 7, lines 40-61.

As shown above, Arias does not disclose generating at least one retouched image of the three-dimensional image by arranging a plurality of brush images so as to superpose a part of the plurality of brush images on another part of the plurality of brush images within a rendering region for the three-dimensional object. Instead, Arias teaches solid colors, color lines in the colored image that delineate differently colored portions of the colored images, and contour lines that follow an outline of an object, and compositing the colored image, color lines, and contour lines to produce the cel image. Arias, claim 1. The cel image of Arias is not analogous to, and teaches away from, the three-dimensional image rendered by the method and apparatus recited in the claims. Generating a three-dimensional image defeats the purpose of Arias of generating animation cels with the look of a traditional hand-drawn cartoon animation cel. Generating at least one retouched image of a three-dimensional image by arranging a plurality of brush images defeats the purpose of Arias of generating an animation cel with the look of a traditional hand-drawn cartoon animation cel.

III.d. <u>The §103 Rejection Should Be Withdrawn</u>

For any or all of the above reasons, Applicants respectfully request withdrawal of rejections under 35 U.S.C. §103(a).

IV. Conclusion

In view of the foregoing amendments and arguments, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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WPB:DAD/dxc

Attachment:
Replacement Sheet (Fig. 14)

Date: August 14, 2006

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